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Cosmology from CMB Polarization with POLARBEAR and the Simons Array

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POLARBEAR is a cosmic microwave background (CMB) polarization experiment located in the Atacama desert in Chile. The science goals of the POLARBEAR project are to do a deep search for CMB B-mode polarization created by inflationary gravitational waves, as well as characterize the CMB B-mode signal from gravitational lensing. POLARBEAR-1 started observations in 2012, and the POLARBEAR team has published a series of results from its observations, including the first measurement of a non-zero B-mode polarization angular power spectrum, measured at sub-degree scales where the dominant signal is gravitational lensing of the CMB. POLARBEAR is expanding to POLARBEAR-2/Simons Array, with two new telescopes and three new multi-chroic receivers, increasing sensitivity and frequency coverage. The first of the next-generation receivers, known as PB-2a, had first light in early 2019. With high sensitivity and large sky coverage, PB-2/Simons Array will create a detailed survey of B-mode polarization, and its spectral information will be used to extract the CMB signal from astrophysical foregrounds. We will present the latest POLARBEAR results, as well as the status of commissioning the Simons Array.